World Federation of Engineering Organizations
Fédération Mondiale des Organisations d'ingénieurs
Official partner of UNESCO (associate status)

Engineering Sustainable Cities

- Resilient, livable, harmonious with nature

GONG Ke
President of World Federation of Engineering Organizations

Today's city: Challenges and Opportunities

- More job opportunities
- Better educational, health and cultural services
- Shared infrastructure
- Utilities accessibility
- Energy efficiency
- Integrated Waste treatment
- ……

- growing congestions
- worsening air quality
- insufficient availability of water
- lack of proper waste disposal
- public health concerns
- ……

The role of engineering for livable city

GSDR: "With **key interventions**, cities become **sustainable development leaders and laboratories** for the world at large."

- **Technologies**
  - Big Data
  - Artificial Intelligence
  - ……
- **Arts and Design**
- **Public services**

- ✓ **Higher productivity creating more job opportunities**
- ✓ **Better and resilient infrastructure with higher energy efficiency and lower/zero carbon emissions**
- ✓ **Better social service for easier access to education, healthcare and cultural life with safety and security**

Smart Cities

With help of **Big data**, the implementation of **Smart City** can cut down on **traffic congestion and accidents**, increase **nature-based solutions** to adapt for **climate change**, address **pollution and other health and safety risks.**

30–300	30–40%	8–15%	15–30	25–80	20–35%
lives saved each year in a city of 5 million	fewer crime incidents	lower disease burden	minutes shaved off the daily commute	liters of water saved per person per day	faster emergency response times

MCKINSEY GLOBAL INSTITUTE

McKinsey&Company

Lessons learnt from the pandemic:

• public buildings such as offices, schools, shopping malls, cinemas and cultural facilities are in risk of indoor virus transmission

• Insufficient resistance of medical facilities in surge of patients, they fall into a difficult situation due to inadequate capacity in functional expansion and conversion

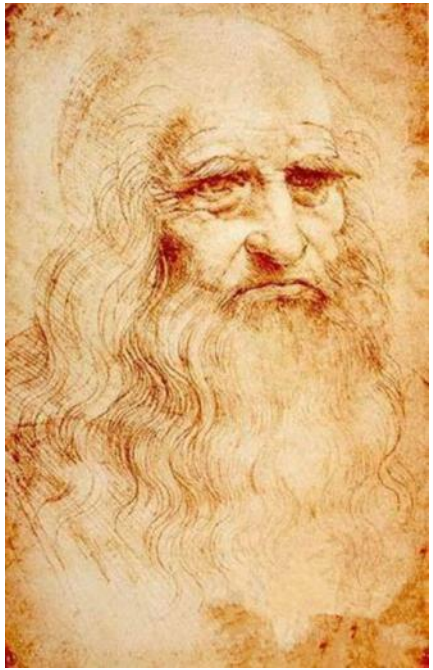
• some gymnasiums and exhibition halls that have been renovated to field hospitals have difficulties in sanitary facilities and disposing sewage

Need of collaboration of engineering and arts

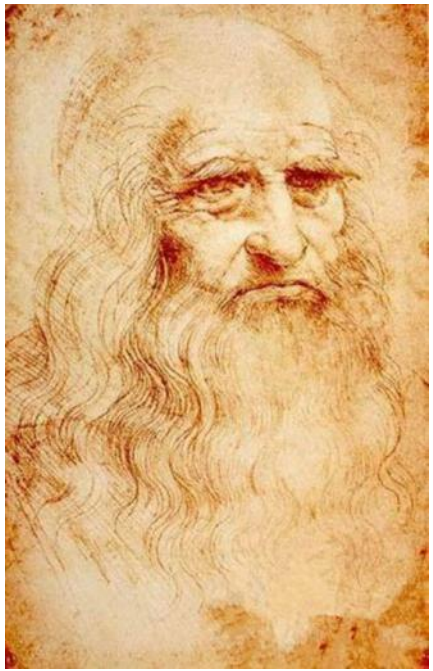



Cities does not only provide safe and convenient material life, but also provide pleasant spiritual life; Urban design should not only be ensuring safe and convenient, but also aesthetically appealing.

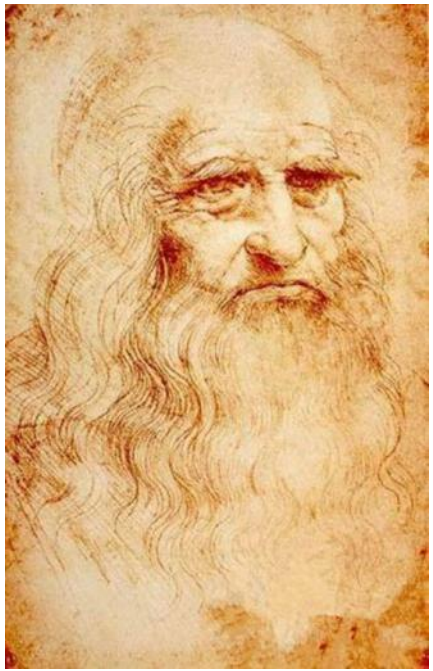
There are needs to identify the challenges more comprehensively from the aspects of both material and spiritual life, and these challenges should be met by engineers and artists as well as other stakeholders jointly.

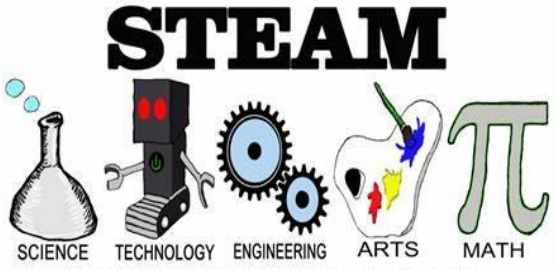


Leonardo da Vinci is a role model of the combination of art and science and engineering. He is not only a great artist with his works, such as the Mona Lisa and the Last Supper, occupying unique positions as the most widely popular and influential paintings of the Renaissance. But he was also an architect and engineer. He used his superb intellect and mastery of the art of drawing to study nature itself, that allowed his dual pursuits of art and science to flourish. His notebooks reveal a spirit of scientific inquiry and a mechanical inventiveness.



Steve Jobs took a calligraphy class when studied at Stanford and ten years later designed it all into the Mac, which was the first computer with beautiful typography. He had ensured throughout all his companies, from Apple to Pixar, that scientists, engineers and technologists must work together with artists and designers.





So It is important to reinforce the STEAM education, to bring art to engineering education and vice versa.

Thank you


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS